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(54) **PRINTING SYSTEM**

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CPC ***B65G 45/10*** (2013.01); ***B41J 29/17*** (2013.01)

(58) **Field of Classification Search**
CPC B65G 45/10; B41J 29/17
USPC 198/494
See application file for complete search history.

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(57) **ABSTRACT**

A printing system is described, which comprises: a conveyor belt; a first substrate supply mechanism to supply a cleaning substrate to said conveyor belt; wherein said conveyor belt is to advance a supplied cleaning substrate, and said first substrate supply mechanism is controllable to adjust motion of said substrate relative to said conveyor belt such that when said conveyor belt is activated said supplied cleaning substrate slides relative to the conveyor belt; and said printing system further comprising a friction adjustment mechanism to adjust an amount of friction between said conveyor belt and said supplied substrate.

13 Claims, 4 Drawing Sheets

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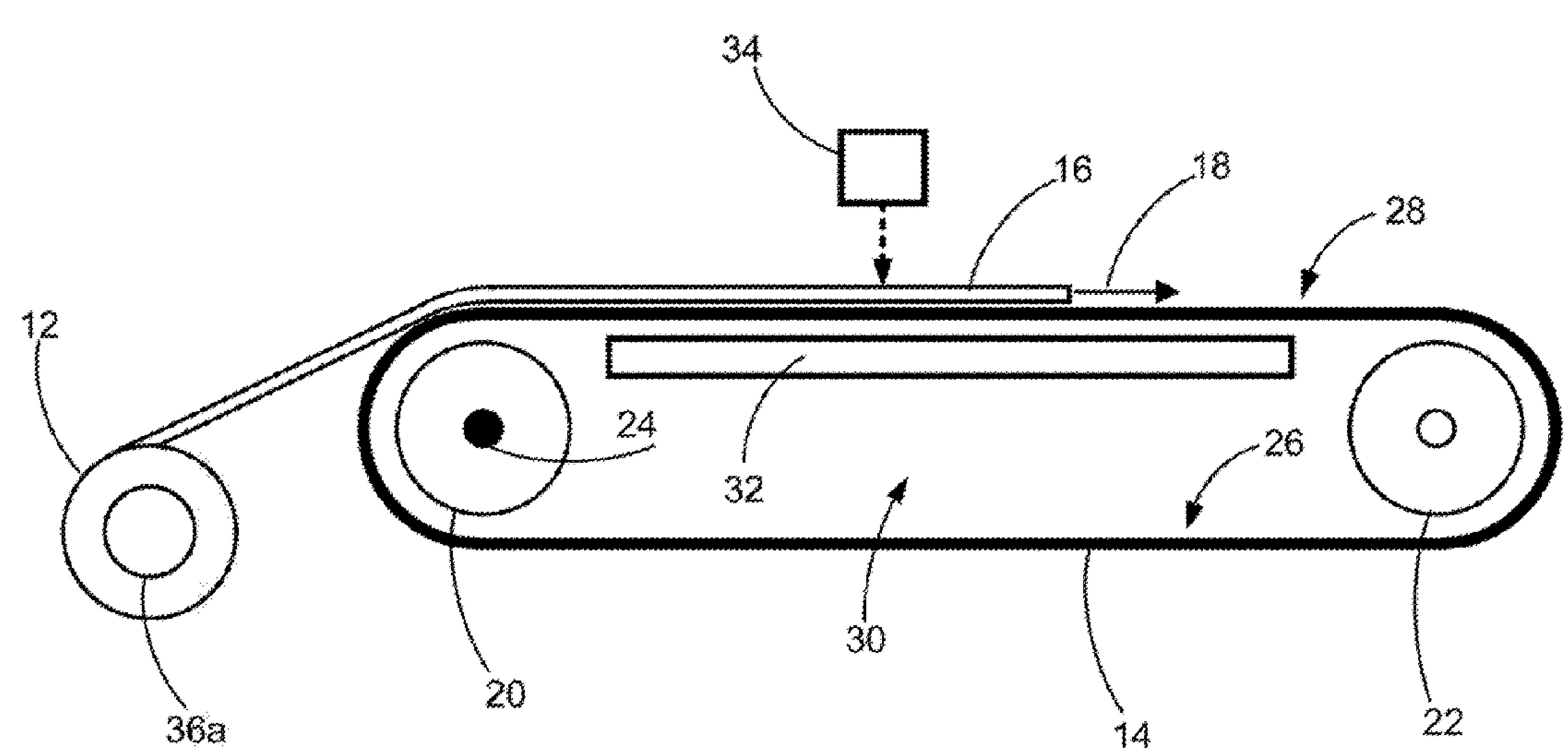

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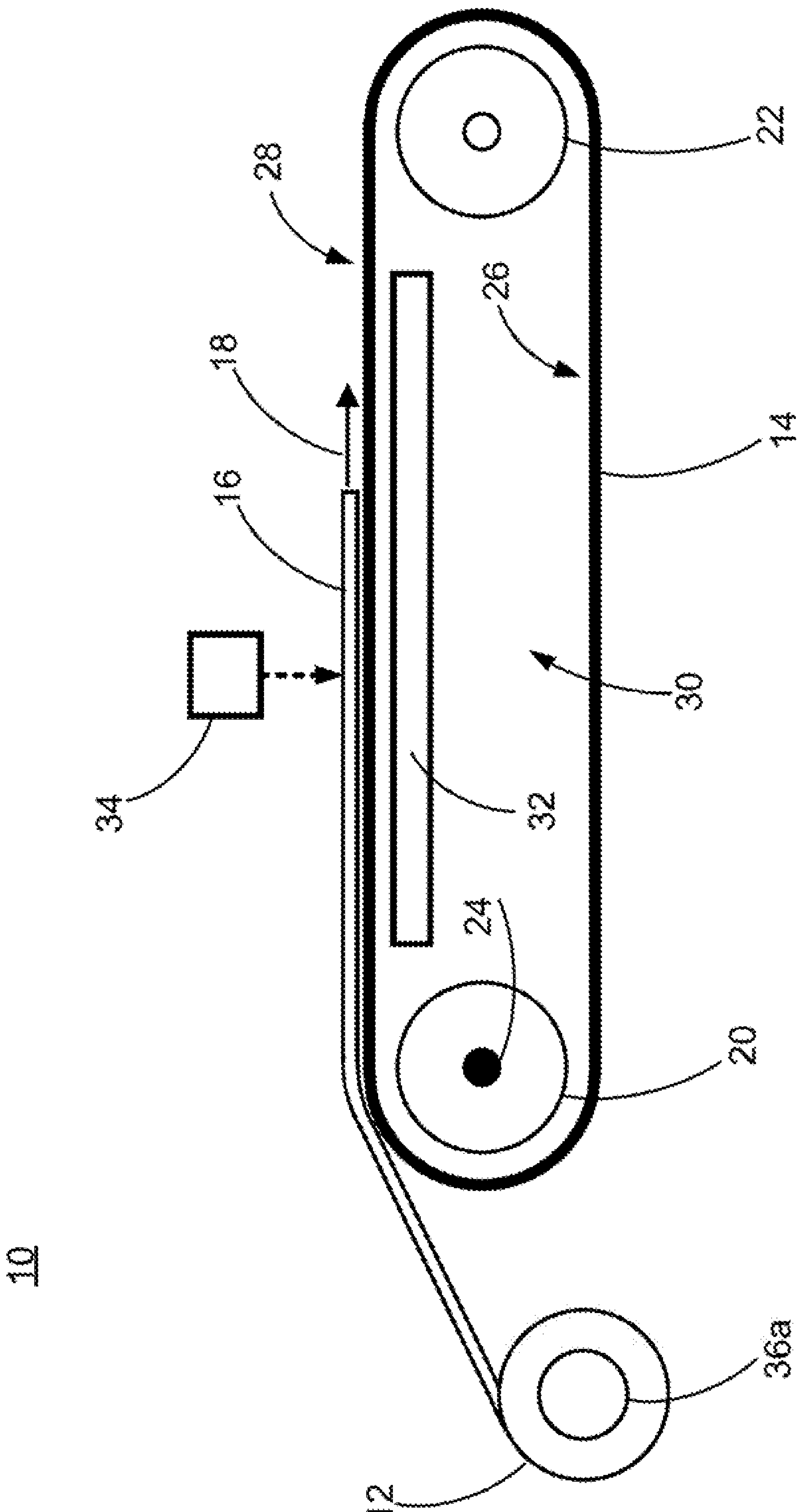

Fig. 1

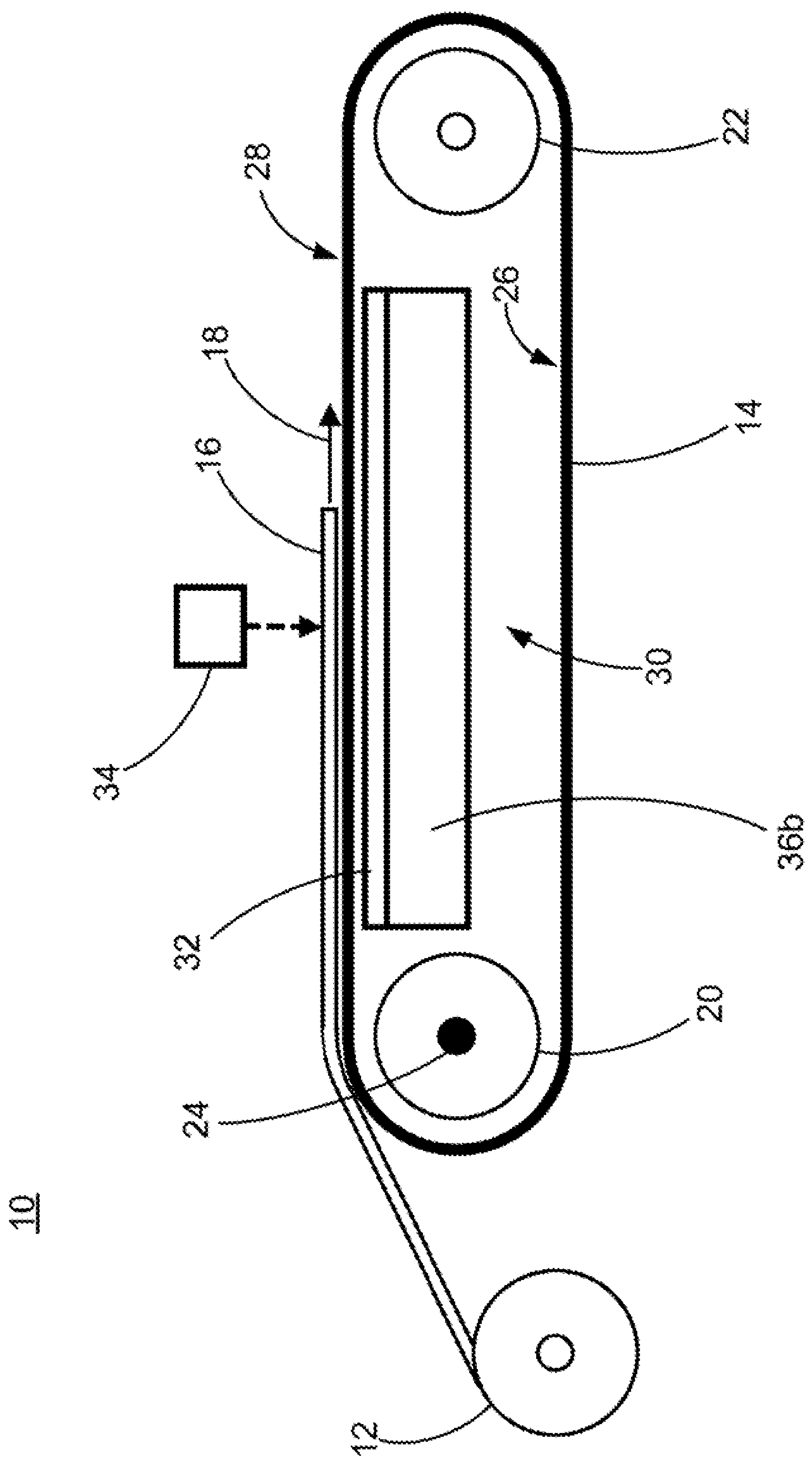

Fig. 2

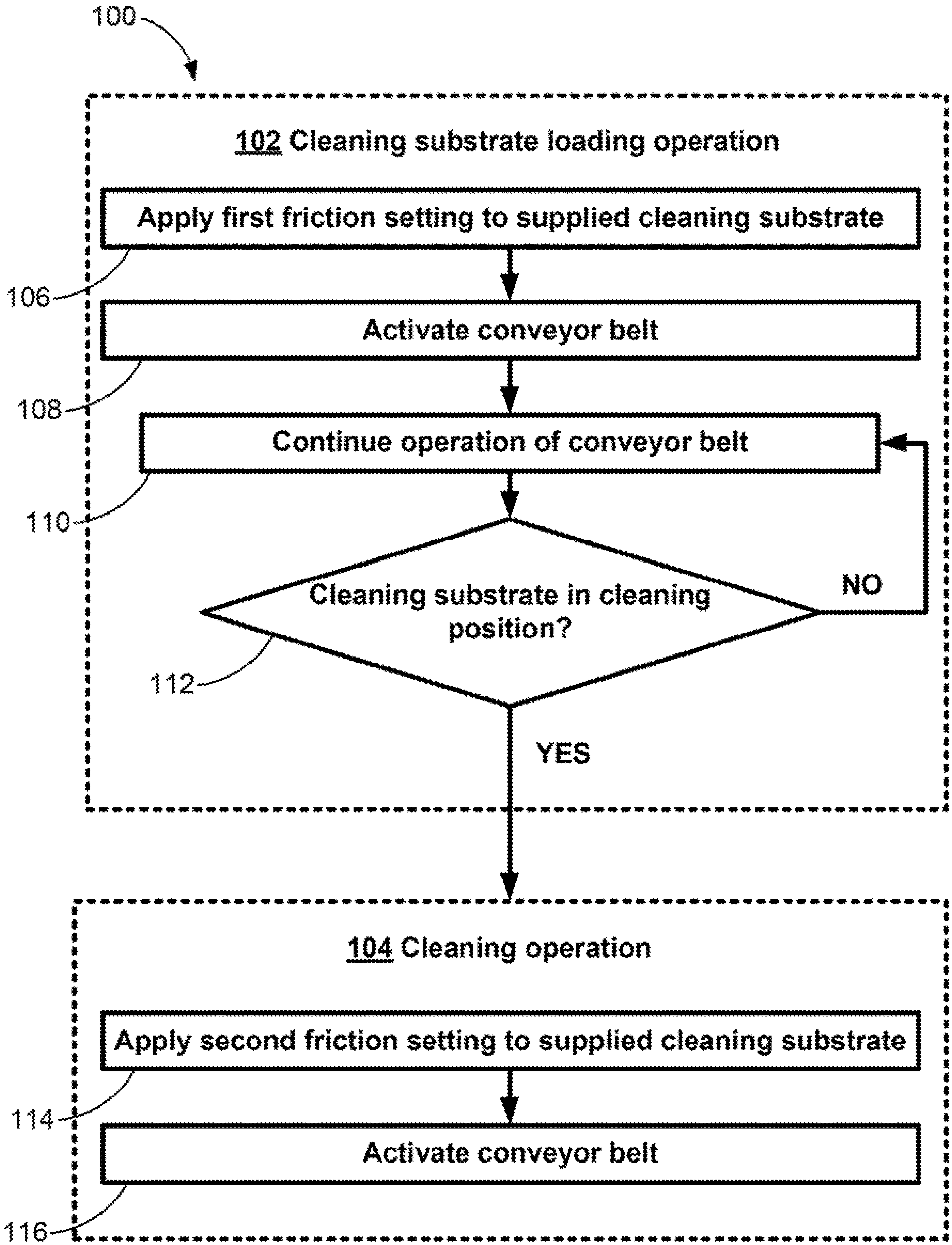
100
102 Cleaning substrate loading operation
Apply first friction setting to supplied cleaning substrate
106
Activate conveyor belt
108
Continue operation of conveyor belt
110
Cleaning substrate in cleaning position?
NO
112
YES
104 Cleaning operation
Apply second friction setting to supplied cleaning substrate
114
Activate conveyor belt
116

Fig. 3

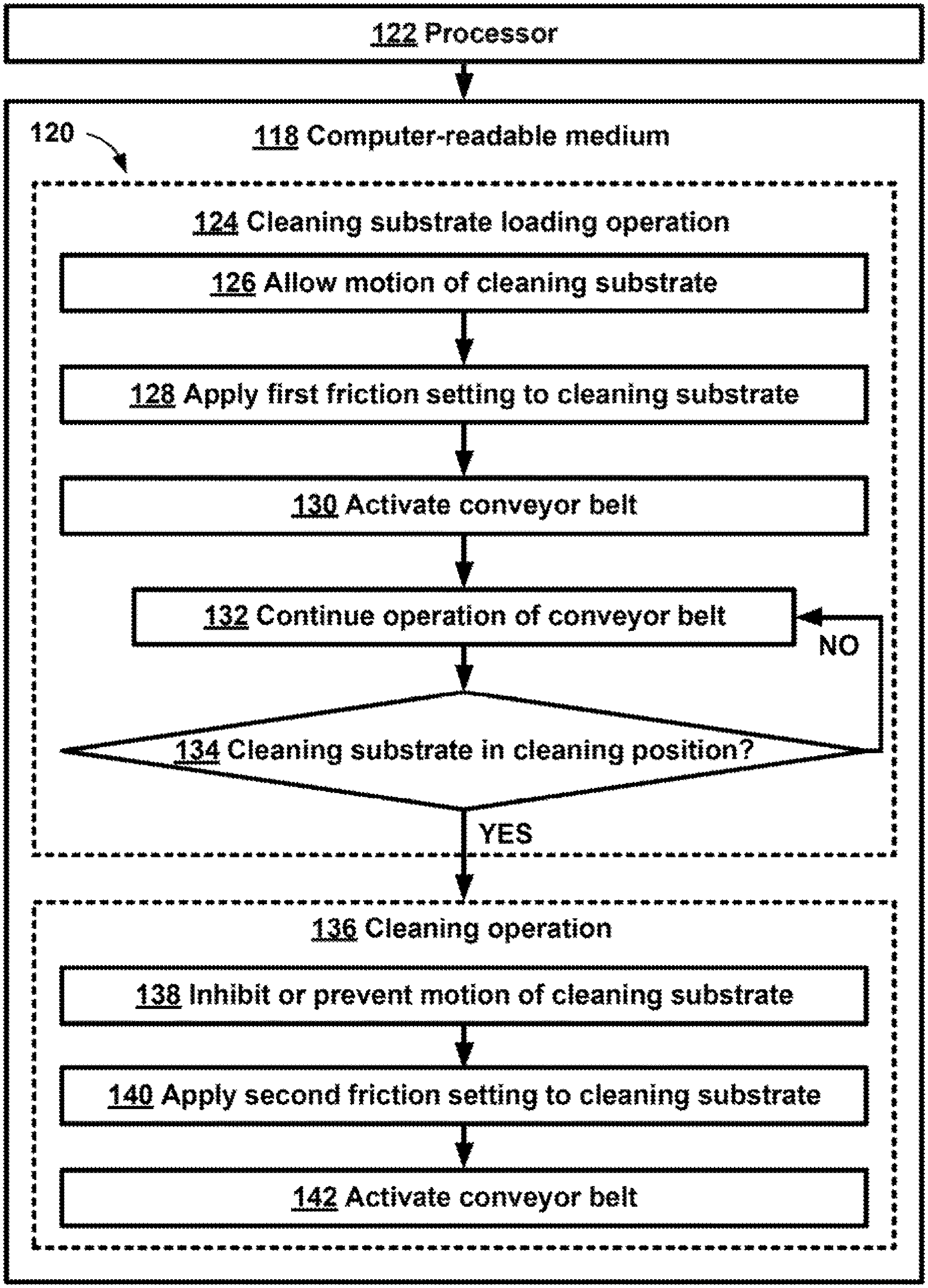
122 Processor
120
118 Computer-readable medium
124 Cleaning substrate loading operation
126 Allow motion of cleaning substrate
128 Apply first friction setting to cleaning substrate
130 Activate conveyor belt
132 Continue operation of conveyor belt
NO
134 Cleaning substrate in cleaning position?
YES
136 Cleaning operation
138 Inhibit or prevent motion of cleaning substrate
140 Apply second friction setting to cleaning substrate
142 Activate conveyor belt

Fig. 4

PRINTING SYSTEM

BACKGROUND

Some printing systems include a conveyor belt to support and move a printing substrate in coordination with printing components to produce a printed product. The printing substrate is supplied to the conveyor belt from a print substrate supply mechanism. In such printing systems, a printing substrate may become skewed during a printing operation and, consequently, a print agent may be deposited on the conveyor belt instead of the printing substrate. Also leakage of a print agent onto the conveyor belt may occur. Accumulation of print agent on the conveyor belt is removed during a maintenance and/or cleaning operation. A conveyor belt maintenance and/or cleaning operation may be carried out by a service technician with a cleaning implement, e.g. a brush. However, cleaning in this manner could potentially damage the conveyor belt, for example if the service technician uses excessive force when applying the cleaning implement.

Such printing systems may also be maintained and/or cleaned to remove print agent deposits from the conveyor belt by passing a cleaning substrate across the conveyor belt. This is achieved by loading the cleaning substrate in the print substrate supply mechanism and conducting a cleaning operation by moving the cleaning substrate relative to the conveyor belt.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** illustrates a schematic representation of a printing system according to an example;

FIG. **2** illustrates a schematic representation of a printing system according to another example;

FIG. **3** illustrates a method of operating a printing system according to an example; and

FIG. **4** illustrates a non-transitory computer-readable storage medium according to an example.

DETAILED DESCRIPTION

Certain examples described herein relate to printing systems with a conveyor belt to advance rigid or flexible print substrate, onto which an image is printed. In some examples, the printing system is a two-dimensional (2D) printing system such as an inkjet or digital offset printer. In these examples, the print substrate may comprise paper, cardstock, boards, metal sheet, plastic sheet, and the like. The printing system may be a large format printer for printing signs, billboards and/or other displays in latex-based inks. .A sheet of print substrate rests on top of the conveyor belt and is driven through a print zone. In the print zone, an image is printed onto the substrate, for example by applying printing fluid using inkjet print heads mounted above the conveyor belt. In other examples, the printing system is a three-dimensional (3D) printing system, otherwise known as an additive manufacturing system. In these examples, the print substrate may comprise a build material. For example, the build material may be deposited on top of the conveyor belt and be driven through the additive manufacturing system. Some additive manufacturing systems use a "layer-by-layer" approach, where a solidification process is applied to each layer of deposited build material before the next layer of build material is applied. Various methods can be used to secure the print substrate to the conveyor belt. For example, a vacuum mechanism may be used to secure the print substrate to the conveyor belt via suction.

In such printing systems, a cleaning substrate can be loaded in the printing system, advanced over the conveyor belt and then held relative to the conveyor belt while the conveyor belt moves, or moved relative to the conveyor belt. A cleaning operation can be implemented by causing relative movement between the cleaning substrate and the conveyor belt to allow deposits to be cleaned, or scrubbed, therefrom.

FIGS. **1** and **2** show schematic representations of printing system **10** according to examples.

Referring to FIG. **1**, the printing system **10** comprises a first substrate supply mechanism **12** to provide a cleaning substrate and/or a print substrate to a conveyor belt **14** of the printing system **10**. In some examples, first substrate supply mechanism is to provide a cleaning substrate to the conveyor belt **14** (and a second substrate supply mechanism (not shown) is to provide a print substrate to the conveyor belt **14**). In other examples, the first substrate supply mechanism **12** can provide a cleaning substrate or a print substrate, with the cleaning substrate and print substrate interchangeable in the first substrate supply mechanism **12** dependent upon an operation to be performed (i.e. a cleaning operation or a printing operation). In some examples, the first substrate supply mechanism **12** comprises a roll for supplying flexible cleaning substrate. Examples of cleaning substrate include a substrate comprising a cleaning surface comprising at least one of a textured surface; a rough surface; an uneven surface; a solvent; and a first portion including a solvent and a second portion excluding a solvent. The cleaning substrate may comprise paper (e.g. a paper with a rough surface such as wallpaper) and/or flexible plastic. Such a roll may comprise flexible substrate wound around a core, to enable compact storage.

As indicated above, the printing system **10** further comprises conveyor belt **14**. The first substrate supply mechanism **12** can supply cleaning substrate **16** to the conveyor belt **14**. The conveyor belt **14** is to advance the supplied cleaning substrate in a conveyance direction **18** until the cleaning substrate is located in a cleaning position. The conveyor belt **14** can include a loop or band of material with sufficient flexibility to bend or deform around rollers for moving the conveyor belt **14**. In some examples, the conveyor belt **14** can include segmented rigid or semi-rigid sections coupled to one another by hinged connectors.

In some examples, the conveyor belt **14** is disposed around a drive roller **20** and an idle roller **22**. The drive roller **20** can comprise a drive mechanism **24**, for example a motor or a motorized shaft, for turning the drive roller **20**. In turn, the drive roller **20** can apply a force to the conveyor belt **14** that causes it to move about the rollers **20**, **22**. As such, rotational movement of the drive roller **20** can be translated into corresponding linear motion of the conveyor belt **14**. The linear motion of the conveyor belt **14** can then be used to move material disposed thereon.

In examples, the conveyor belt **14** is elongate with a length in the conveyance direction **18** that the conveyor belt **14** moves in, and a lateral dimension or width in a direction perpendicular to the conveyance direction **18**. The length may be larger than the width.

The conveyor belt **14** has an interior surface **26** and an exterior surface **28**. The exterior surface **28** is a surface on which cleaning substrate **16** is carried and/or supported (during a cleaning operation, and on which a print substrate would be carried during a print operation). In examples, the cleaning substrate **16** is held to the exterior surface **28** by gravity, friction, clamps, and/or vacuum (see FIG. **2**). The interior surface **26** may be considered the surface of the conveyor belt **14** in contact with or disposed in proximity to the rollers **20**, **22** on which the conveyor belt **14** moves. As such, the conveyor belt **14** can define an interior and exterior relative to the conveyor belt **14**. For example, the region within the confines of the loop of the conveyor belt **14** and proximate to the interior surface **26** of the conveyor belt **14** can be referred to herein as the conveyor belt interior **30**.

In some examples, in which the first substrate supply mechanism **12** comprises a roll of substrate, the roll is received by a rotatable shaft of the substrate supply mechanism **12**. During a cleaning operation (and also a printing operation), the rotatable shaft unwinds the roll at the speed of the conveyor belt **14**, for example by way of a servo controlling the rotation or by way of the substrate being pulled by the conveyor belt **14**.

The cleaning operation differs from the printing operation in that when the cleaning substrate reaches the cleaning position, unwinding of the roll of cleaning substrate is stopped, but the motion of the conveyor belt **14** continues so that the unwound portion of cleaning substrate rubs, passes, or brushes over the exterior surface **28** of conveyor belt **14**. In some examples, the cleaning substrate **12** may be wound back onto the roll so that a leading edge of the cleaning substrate **12** moves in a direction opposite to a conveyance direction **18** of the conveyor belt **14**. During a printing operation, a printing substrate would continue to be unwound from the roll until a print operation is complete. In other words, the first substrate supply mechanism **12** is controllable to adjust motion of the cleaning substrate **16** relative to the conveyor belt **14** such that when the conveyor belt **14** is activated the supplied cleaning substrate **16** slides relative to the conveyor belt **14**.

In some examples, the printing system **10** comprises a substrate position indicator to indicate a loading position for the cleaning substrate **16**. In one such example, a user loads a roll of substrate onto the aforementioned rotatable shaft and inflates pneumatic lugs to lock the roll onto the shaft. The user then partially unrolls the substrate **16** onto the conveyor belt **14**. The substrate position indicator, for example an alignment bar or reference mark, serves to indicate an approximate suitable position for the leading edge of the substrate **16**

The printing system **10** also comprises a platen **32** within the conveyor belt interior **30** and proximate to the interior surface **26** of the conveyor belt **14**. The platen **32** provides a flat surface to support the cleaning substrate **16** during a cleaning operation (and can also support a print substrate during a printing operation).

The printing system **10** also comprises printing elements **34**, for example including a print head or print heads for applying printing material or printing fluid, such as ink, to a print substrate during a printing operation. In some examples, the printing elements **34** can move laterally during printing as the conveyor belt **14** moves intermittently in the conveyance direction **18**. In other examples, the printing elements **34** are static and extend over the width of a print substrate on which printing is performed.

In the printing system **10**, the first substrate supply mechanism **12** is controllable by a control mechanism (not shown) to adjust motion of the substrate **16**, i.e. the first substrate supply mechanism **12** can be switched between a state in which supply of the cleaning substrate **16** is allowed, and a state in which supply of substrate **16** is prevented. For example, where the first substrate supply mechanism **12** comprises a roll of flexible substrate, a locking mechanism may be provided to adjust motion of the substrate **16** supplied by the first substrate supply mechanism **12**. This can be achieved by the locking mechanism acting upon the first substrate supply mechanism **12** as a brake to prevent rotation of the roll. In other examples, the locking mechanism can act directly on the cleaning substrate **16**, for example by clamping the cleaning substrate **16** to prevent motion. Alternatively or additionally, as noted above, in some examples where the first substrate supply mechanism **12** comprises a shaft for receiving a roll of substrate, the shaft is rotatable by a servo. Motion of the cleaning substrate **16** can be adjusted by the controlling the servo prevent such motion.

The printing system **10** also comprises a friction adjustment mechanism to adjust an amount of friction between the conveyor belt **14** and a supplied cleaning substrate **16**. In some examples (FIG. **1**) the friction adjustment mechanism **36***a* can control the first substrate supply mechanism **12** so that motion of the cleaning substrate **16** relative to the conveyor belt **14** can be adjusted. In such examples, the friction adjustment mechanism **36***a* comprises a separate, additional feature to the control mechanism, and acts on the first substrate supply mechanism **16** to apply a tensioning force to the supplied substrate to set tension of the substrate to a tension suitable for the cleaning operation. In one such example, following a loading operation of the cleaning substrate **16** into the first substrate supply mechanism **12**, motion of the substrate **16** is allowed and the friction adjustment mechanism **36***a* acts on the first substrate supply mechanism **12** to apply a force to the substrate **16** in a direction opposite to the conveyance direction **18**. For example, where the first substrate supply mechanism **12** comprises a roll of substrate, the friction adjustment mechanism **36***a* can act upon the roll to rotate the roll away from the conveyor belt **14**, i.e. in a "rewinding" direction, to provide the tension. This "tensioning" also adjusts an amount of friction between cleaning substrate **16** and conveyor belt **14**. The friction adjustment mechanism **36***a* can also act upon the roll to prevent movement of the roll (i.e. prevent further unwinding of the roll) so that a leading edge of the roll remains in a same position while the conveyor belt **14** can be free to move thereunder. The friction adjustment mechanism **36***a* can also act upon the roll to slow movement of the roll compared with a speed at which the conveyor belt **14** advances in the conveyance direction. In other words, the roll can be unwound, but at a rate that is slower than that of the conveyor belt so that a point on the cleaning substrate **16** will not advance in the conveyance direction as quickly as a point on the conveyor belt **14**. In all these examples, adjusting the movement of the cleaning substrate **16** relative to the conveyor belt **14** adjusts an amount of friction between the conveyor belt **14** and cleaning substrate **16**.

In a further example, the friction adjustment mechanism **36***a* can operate to unwind a roll of cleaning substrate during some parts of a cleaning cycle and rewind the roll during other parts of the cleaning cycle. Such unwinding and rewinding may occur alternately on a periodic basis. Periods of unwinding and rewinding may be of equal lengths of time, or may be different, or may be random.

In the above-described examples, the friction adjustment mechanism **36***a* comprises the control mechanism and acts on the substrate supply mechanism **12** to prevent motion of the substrate **16** by engaging, or partially engaging, a locking element. For example, where the substrate supply mechanism comprises a roll of flexible substrate, the locking mechanism may comprise a brake preventing, or reducing, rotation of the roll. In other examples, the locking mechanism can act directly on the substrate **16**, for example by clamping the substrate **16** to prevent, or reduce, motion. In further examples where the first substrate supply mechanism **12** comprises a shaft for receiving a roll of substrate, the shaft is rotatable by a servo. Motion of the substrate **16** can be adjusted by the friction adjustment mechanism **36***a* controlling the servo to prevent such motion. In further examples, the friction adjustment mechanism **36***a* can comprise the servo.

In some examples, the friction adjustment mechanism **36***a* can act as the control mechanism.

In further examples of a friction adjustment mechanism (see FIG. **2**), a friction adjustment mechanism **36***b* comprises a pressure application mechanism to adjust an amount of friction between the supplied substrate **16** and the conveyor belt **14**. Increasing pressure applied by the pressure application mechanism to the cleaning substrate **16** forces the cleaning substrate **16** into the exterior surface **28** of the conveyor belt **14** with greater force and reducing the pressure reduces the force that the cleaning substrate **16** exerts on the exterior surface of the conveyor belt **14**, i.e. am amount of friction between the cleaning substrate **16** and the conveyor belt **14** is dependent upon the force applied by the pressure application mechanism.

In some examples, the pressure application mechanism of the friction adjustment mechanism **36***b* comprises a vacuum pump, positioned in the interior **32** of the conveyor belt **14** (i.e. as shown in FIG. **2**), to exert vacuum pressure on the substrate **16** to reduce or increase the force at which the cleaning substrate **16** is held against the conveyor belt **14**. In such examples, the conveyor belt **14** can include openings, channels, or holes through which the vacuum pump can apply the vacuum to the cleaning substrate **16**. In other examples, the pressure application mechanism of the friction adjustment mechanism **36***b* can comprise another type of pressure source, such as a pump or other element to press the cleaning substrate **16** onto the conveyor belt **14** from above. The pressure application mechanism of the friction adjustment mechanism **36***b* can thus provide a force that adjusts the friction between the cleaning substrate **16** and the exterior surface **28** of the conveyor belt **14**.

Although a printing system **10** is illustrated with one type of friction adjustment mechanism in the figures (i.e. friction adjustment mechanism **36***a* in FIG. **1** and friction adjustment mechanism **36***b* in FIG. **2**), in other examples, the printing system **10** may comprise both types of friction adjustment mechanism, i.e. **36***a* and **36***b*. Further, both types of friction adjustment mechanism may be employed together, or separately, in a printing system **10** with the control mechanism.

The following description applies to the printing system **10** of FIG. **1**. The printing system **10** performs a substrate loading operation, in which cleaning substrate **16** is loaded for a cleaning operation. During such a substrate loading operation of the printing system **10**, the first substrate supply mechanism **12** is allowed to release the cleaning substrate **16** so that it can pass onto the conveyor belt **14**. When the conveyor belt **14** is activated, the supplied substrate **16** moves with the conveyor belt **14** and the leading edge advances in the conveyance direction **18**. Upon reaching the cleaning position, motion of the cleaning substrate **16** is inhibited by controlling the first substrate supply mechanism **12** to adjust motion of the substrate relative to the conveyor belt to prevent further advancement of the substrate **16**. This can be done by the control mechanism, or by the friction adjustment mechanism **36***a* (if the friction adjustment mechanism **36***a* is the control mechanism), or by a combination of both mechanisms (if both are present).

As such, during the substrate loading operation, motion of the cleaning substrate **16** is allowed and the conveyor belt **14** is activated to rotate in the conveyance direction **18** to advance the cleaning substrate **16** toward the cleaning position. When the cleaning substrate **16** is in the cleaning position, advancement of the cleaning substrate **16** is inhibited by the control mechanism (e.g. locking element and/or servo) and/or the friction adjustment mechanism **36***a*. Therefore, in an example, the first substrate supply mechanism **12** allows motion of the cleaning substrate **16** during a loading operation of the printing system **10** until the cleaning position is reached. For example, motion of the cleaning substrate **16** during the loading operation is allowed by disengaging a locking element from the first substrate supply mechanism **12**, and/or controlling a servo to allow motion, and/or by controlling the friction adjustment mechanism **36***a* to allow motion. Motion of the cleaning substrate during a cleaning operation is inhibited or prevented, or can be allowed periodically in the conveyance direction and in a direction opposite to the conveyance direction, by engaging the locking element with the first substrate supply mechanism, and/or by controlling the servo to adjust motion of the cleaning substrate, and/or by controlling the friction adjustment mechanism **36***a* to adjust motion of the cleaning substrate.

The following description applies to the printing system **10** of FIG. **2**. The printing system **10** performs a substrate loading operation, in which cleaning substrate **16** is loaded for a cleaning operation. During such a substrate loading operation of the printing system **10**, the first substrate supply mechanism **12** is allowed to release the cleaning substrate **16** so that it can pass onto the conveyor belt **14**. When the conveyor belt **14** is activated, the supplied substrate **16** moves with the conveyor belt **14** and the leading edge advances in the conveyance direction **18**. Upon reaching the cleaning position, motion of the cleaning substrate **16** is inhibited by controlling the first substrate supply mechanism **12** to adjust motion of the substrate relative to the conveyor belt to prevent further advancement of the substrate **16**. This can be done by the control mechanism, by the friction adjustment mechanism **36***a* (if the friction adjustment mechanism **36***a* is the control mechanism), or by a combination of both mechanisms (if both are present).

During the substrate loading operation, the friction adjustment mechanism **36***b* applies a first pressure such that when the conveyor belt **14** is activated, the cleaning substrate **16** moves with the conveyor belt. In other words, the friction adjustment mechanism **36***b* applies a pressure that is sufficient to maintain the cleaning substrate **16** against the conveyor belt **14**, but not so low that the cleaning substrate **16** slides over the conveyor belt **14**. As such, when the conveyor belt **14** moves, the cleaning substrate **16** also moves with no sliding, curling, or lifting. The cleaning substrate **16** moves in this manner until it reaches the cleaning position.

During a cleaning operation of the printing system **10** of FIG. **2**, the friction adjustment mechanism **36***b* applies a second pressure, different from the first pressure. The second pressure is such that when the conveyor belt **14** is activated during the cleaning operation, the cleaning substrate **16** slides over the conveyor belt **14**. The second pressure is thus sufficient to allow the cleaning substrate **16** disposed on the exterior surface **28** of the conveyor belt **14** to slide over the conveyor belt **14** as the conveyor belt **14** moves.

FIG. **3** shows a schematic representation of a method **100** of operating a printing system **10** according to an example. As described above, the printing system **10** comprises a first substrate supply mechanism **12** to supply cleaning substrate **16** to a conveyor belt **14**. The conveyor belt **14** is to advance the supplied cleaning substrate **16** to a cleaning position.

The method **100** comprises performing a substrate loading operation **102** of the printing system **10** and performing a cleaning operation **104** of the printing system **10**. In examples, the substrate loading operation is initiated by a user, via an interface of the printing system **10**, after inserting substrate into the first substrate supply mechanism **12**. In some examples the interface is a physical interface, for example comprising a keypad mounted onto or communicatively coupled with the printing system **10**. In other examples, the interface is an interface implemented using machine readable instructions and accessed for example via a computer connected to the printing system **10** by a network. In some such examples, the substrate loading operation **102** and cleaning operation **104** are performed in response to a user initiating a cleaning process. This allows, for example, a cleaning process to be performed in response to a single command from the user, with conveyor belt cleaning being performed without requiring separate user input. The efficiency of the cleaning process is thus improved.

The substrate loading operation **102** comprises applying **106** a first friction setting to the supplied cleaning substrate **16** to cause the supplied cleaning substrate **16** to remain against the conveyor belt **14**. In one example, the first friction setting is applied by friction adjustment mechanism **36***a*, as described above in relation to FIG. **1**. In another example, the first friction setting is applied by friction adjustment mechanism **36***b*, as described above in relation to FIG. **2**. In a further example, the first friction setting is applied by a combination of the friction adjustment mechanism **36***a*, as described above in relation to FIG. **1** and the friction adjustment mechanism **36***b*, as described above in relation to FIG. **2**.

The substrate loading operation **102** then comprises activating **108** the conveyor belt **14**. The first friction setting allows the supplied cleaning substrate **16** to slide with the conveyor belt **14**, thereby being advanced by the conveyor belt **14** in the conveyance direction **18**. Operation of the conveyor belt **14** continues **110** to continue advancing the cleaning substrate **16** toward the cleaning position. A determination is performed **112** to determine if the cleaning substrate **16** is in the cleaning position. If not, operation of the conveyor belt **14** continues **110**. If the cleaning substrate **16** has reached the cleaning position, the conveyor belt **14** is then deactivated.

The cleaning operation **104** comprises applying **114** a second friction setting to the supplied cleaning substrate **16**. The second friction setting causes the supplied cleaning substrate **16** to slide relative to the conveyor belt **14**. In one example, the first friction setting is applied by friction adjustment mechanism **36***a*, as described above in relation to FIG. **1**. In another example, the first friction setting is applied by friction adjustment mechanism **36***b*, as described above in relation to FIG. **2**. In a further example, the first friction setting is applied by a combination of the friction adjustment mechanism **36***a* as described above in relation to FIG. **1** and the friction adjustment mechanism **36***b*, as described above in relation to FIG. **2**.

The cleaning operation **104** then comprises activating **116** the conveyor belt **14**. The second friction setting is such that the supplied cleaning substrate **16** slides over the conveyor belt **14**.

In some examples, instead of deactivating the conveyor belt **14** following the first activation **108**, the conveyor belt is activated **108** following application **106** of the first friction setting and remains activated during the cleaning operation **104**.

In examples, the substrate loading operation **102** comprises allowing motion of the substrate **16**, for example by allowing motion of the substrate supply mechanism **12** as described above. In such examples, the cleaning operation **104** comprises inhibiting or preventing motion of the substrate **16**, for example by inhibiting or preventing motion of the substrate supply mechanism **12**.

FIG. **4** shows an example of a non-transitory computer-readable storage medium **118** comprising a set of computer readable instructions **120** which, when executed by at least one processor **122** of a printing system **10** comprising a first substrate supply mechanism **12** to supply cleaning substrate **16** to a conveyor belt **14**, cause the processor **122** to perform a method according to examples described herein. The computer readable instructions **120** may be retrieved from machine-readable media, e.g. any media that can contain, store, or maintain programs and data for use by or in connection with an instruction execution system. In this case, machine-readable media can comprise any one of many physical media such as, for example, electronic, magnetic, optical, electromagnetic, or semiconductor media. More specific examples of suitable machine-readable media include, but are not limited to, a hard drive, a random access memory (RAM), a read-only memory (ROM), an erasable programmable read-only memory, or a portable disc.

The instructions **120** cause the processor **122** to control the printing system **10** to perform a substrate loading operation **124**. The substrate loading operation **124** comprises allowing motion **126** of the supplied cleaning substrate **16**.

The substrate loading operation **124** comprises applying **128** a first friction setting to the supplied cleaning substrate **16** to cause the supplied cleaning substrate **16** to remain against the conveyor belt, for example as described in more detail above.

The substrate loading operation **124** then comprises activating **130** the conveyor belt **14**. The first friction setting allows the supplied cleaning substrate **16** to slide with the conveyor belt **14** so as to be advanced in a conveyance direction toward a cleaning position.

The substrate loading operation **124** comprises continuing to operate **132** the conveyor belt **14** to continue advancing the cleaning substrate **16** toward the cleaning position. A determination **134** is performed to determine if the cleaning substrate **16** is in the cleaning position. If not, operation of the conveyor belt **14** continues **132**. If the cleaning substrate **16** has reached the cleaning position, the conveyor belt **14** is then deactivated.

The instructions **123** cause the processor **122** to perform a cleaning operation **136**. The cleaning operation **136** comprises inhibiting or preventing **138** motion of the supplied cleaning substrate **16**. The cleaning operation **136** comprises applying **140** a second friction setting to the supplied cleaning substrate **16**. The second friction setting causes the supplied cleaning substrate **16** to slide relative to the conveyor belt **14**. In one example, the first friction setting is applied by friction adjustment mechanism **36***a*, as described above in relation to FIG. **1**. In another example, the first friction setting is applied by friction adjustment mechanism **36***b*, as described above in relation to FIG. **2**. In a further example, the first friction setting is applied by a combination of the friction adjustment mechanism **36***a*, as described above in relation to FIG. **1** and the friction adjustment mechanism **36***b*, as described above in relation to FIG. **2**.

The cleaning operation **136** then comprises activating **142** the conveyor belt **140**. As described in more detail above, the supplied substrate slides over the conveyor belt **14**.

In some examples, instead of deactivating the conveyor belt **14** following the first activation **130**, the conveyor belt is activated **130** following application **128** of the first friction setting and remains activated during the cleaning operation **136**.

In an example implementation of the present disclosure, a conveyor belt may be cleaned by employing the printing system **10** to perform the method described. In summary, the cleaning process comprises: loading cleaning media onto the first substrate supply mechanism; supplying cleaning media from the first substrate supply mechanism to the conveyor belt until the cleaning media is in a cleaning position (i.e. allowing motion of the belt to advance the cleaning media); inhibiting or preventing motion of the media relative to the movement of the belt (i.e. the cleaning media will slip relative to the belt and effectively "scrub" any deposits from the conveyor belt).

In another example implementation, if a level of cleanliness of the conveyor belt is insufficient after completion of the cleaning operation, the operation can be repeated. The operation may be repeated with the same settings as previously, or the first and/or second friction settings that is/are applied may be adjusted to try to achieve a greater level of cleaning. This may be, for example, by increasing the pressure exerted by the vacuum on the cleaning substrate so as to increase the downforce of the cleaning substrate on the conveyor belt (thereby increasing friction between the two).

The preceding description has been presented to illustrate and describe examples of the principles described. This description is not intended to be exhaustive or to limit these principles to any precise form disclosed. Many modifications and variations are possible in light of the above teaching. It is to be understood that any feature described in relation to any one example may be used alone, or in combination with other features described, and may also be used in combination with any features of any other of the examples, or any combination of any other of the examples.

The invention claimed is:

1. A printing system comprising:
- a conveyor belt;
- a first substrate supply mechanism to supply a cleaning substrate to the conveyor belt;
- wherein the conveyor belt is to advance a supplied cleaning substrate, and the first substrate supply mechanism is controllable to adjust motion of the substrate relative to the conveyor belt such that when the conveyor belt is activated the supplied cleaning substrate slides relative to the conveyor belt; and
- the printing system further comprising a friction adjustment mechanism to adjust an amount of friction between the conveyor belt and the supplied substrate; and
- the printing system further comprising a second substrate supply mechanism to supply print substrate to the conveyor belt, wherein the conveyor belt is to advance a supplied print substrate.

2. A printing system according to claim **1**, wherein the friction adjustment mechanism controls the first substrate supply mechanism to adjust motion of the cleaning substrate relative to the conveyor belt.

3. A printing system according to claim **1**, wherein the friction adjustment mechanism prevents motion of the substrate relative to the conveyor belt by engaging a locking element with the first substrate supply mechanism.

4. A printing system according to claim **1**, wherein the friction adjustment mechanism comprises, or further comprises, a pressure application mechanism to adjust a pressure applied to the cleaning substrate by the conveyor belt, and vice versa.

5. A printing system according to claim **4**, wherein the pressure application mechanism comprises a vacuum pump.

6. A printing system according to claim **1**, wherein:
- the first substrate supply mechanism comprises a shaft to receive a substrate roll, the shaft being rotatable by a servo; and
- the friction adjustment mechanism controls the servo to adjust motion of the cleaning substrate relative to the conveyor belt.

7. A printing system according to claim **6**, wherein the first substrate supply mechanism and the second substrate supply mechanism comprise a same supply mechanism.

8. A printing system according to claim **7**, wherein the same supply mechanism is to interchangeably receive the cleaning substrate and the print substrate.

9. A printing system according to claim **1**, further comprising:
- a cleaning substrate, the cleaning substrate including a cleaning surface comprising at least one of:
  - a textured surface;
  - a rough surface;
  - an uneven surface;
  - a solvent; and
  - a first portion including a solvent and a second portion excluding a solvent.

10. A method of operating a printing system, the method comprising:
- performing a cleaning substrate loading operation of the printing system, the cleaning substrate loading operation comprising:
  - applying a first friction setting to the supplied cleaning substrate to cause the supplied cleaning substrate to remain against the conveyor belt;
  - activating the conveyor belt, the first friction setting allowing the supplied cleaning substrate to be advanced by the conveyor belt; and
  - adjusting movement of the supplied cleaning substrate relative to the conveyor belt when the cleaning substrate is located in a cleaning position;
- performing a cleaning operation of the printing system, the cleaning operation comprising:
  - applying a second friction setting, different from the first friction setting, to the supplied cleaning substrate to cause movement of the supplied cleaning substrate relative to the conveyor belt to be adjusted;
  - activating the conveyor belt, the second friction setting allowing the supplied cleaning substrate to slide relative to the conveyor belt;
- inspecting the conveyor belt after the cleaning operation to determine cleanliness of the conveyor belt; and
- responsive to a determination that cleanliness of the conveyor belt is insufficient:
  - performing another cleaning operation of the printing system, the another cleaning operation comprising:
    - applying a third friction setting, different from the first and second friction settings, to the supplied cleaning substrate to cause the supplied cleaning substrate to remain against the conveyor belt; and
    - activating the conveyor belt, the third friction setting allowing the supplied cleaning substrate to slide relative to the conveyor belt.

11. The method of claim 10, wherein inhibiting movement of the cleaning substrate relative to the conveyor belt comprises inhibiting movement of the cleaning substrate supply mechanism.

12. The method of claim 10, wherein the first and second friction settings, or first, second and third friction settings, comprise vacuum pressures.

13. A non-transitory computer-readable storage medium comprising a set of computer-readable instructions stored thereon, which, when executed by a processor of a print system comprising a cleaning substrate supply mechanism to supply cleaning substrate to a conveyor belt, wherein the conveyor belt is to advance a supplied cleaning substrate, cause the processor to control the printing system to:

perform a cleaning substrate loading operation of the printing system, the cleaning substrate loading operation comprising:

applying a first friction setting to the supplied cleaning substrate to cause the supplied cleaning substrate to remain against the conveyor belt;

activating the conveyor belt, the first friction setting allowing the supplied cleaning substrate to be advanced by the conveyor belt; and

adjusting movement of the supplied cleaning substrate relative to the conveyor belt when the cleaning substrate is located in a cleaning position;

perform a cleaning operation of the printing system, the cleaning operation comprising:

applying a second friction setting, different from the first friction setting, to the supplied cleaning substrate to cause movement of the supplied cleaning substrate relative to the conveyor belt to be adjusted;

activating the conveyor belt, the second friction setting allowing the supplied cleaning substrate to slide relative to the conveyor belt;

inspect the conveyor belt after the cleaning operation to determine cleanliness of the conveyor belt; and

responsive to a determination that cleanliness of the conveyor belt is insufficient:

perform another cleaning operation of the printing system, the another cleaning operation comprising:

applying a third friction setting, different from the first and second friction settings, to the supplied cleaning substrate to cause the supplied cleaning substrate to remain against the conveyor belt; and

activating the conveyor belt, the third friction setting allowing the supplied cleaning substrate to slide relative to the conveyor belt.

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